

RESEARCH ON ROMANIA’S WATERMELON AND MELON MARKET

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Abstract

The paper aimed to analyze the evolution of watermelon market and melon market in Romania in order to identify the main trends in the period 1990-2009 based on statistical data and using the specific indicators such as: cultivated area, yield and production, consumption, trade and price. Despite that the cultivated area remained relatively constant at about 33.5 thou ha, watermelon and melon yield increased by 73.36 % from 11.2 tons/ha in 1990 to 19.5 tones /ha in 2009. As a result, total production reached 652.8 thou tons in 2009, being by 71.06 % higher than in 1990. The main trends identified in watermelon and melon production and market in Romania are the following ones: a constant cultivated and producing area, mainly in the East, West and South parts Romania, a continuous increase of yield and production, a diversified offer consisting both of local and imported watermelons and melons, appearance of extra and early fruit of Romanian origin even from June contributing to a better cover of consumer demand along the summer season, an increased competition among suppliers and also a higher income and profit for Romanian producers. Romania’s watermelon and melon market is continuously developing grace to an increased demand for a healthy diet including more vegetables and fruit.

Keywords: market, melon, production, Romania, trade, Trends, watermelon

INTRODUCTION

Melons, as a general „term”, are sweet, juicy and tasty fruits being consumed mainly in the hot season.

Two species of melons are known as follows: watermelon, *Citrullus vulgaris L. sin C. Lanatus (Thlumb) Mansf.* and melon, *Cucumis melo L.*, the both species belonging to the *Cucurbitaceae Family* [2, 25].

The both species are drought tolerant crops being cultivated in a wide range of tropical, semitropical and rigid regions of the world [11].

Watermelon is originary from the old times from the Kalahari Desert, South Africa, where it was growing in a wild manner but also from where it was spread in many countries of the world. In China, India and the Arabian countries it was known even from 1,500 B.C. In the 16th century it started to be cultivated in Europe too from where it was brought in America by the colonists [2].

Watermelon has a green shell, various shapes, sizes and weights, flesh coloured in different

colours (red, yellow, orange and white) and its seeds could be black, but also red and green coloured, exiting even seedless varieties.

Watermelon is a fruit extremely appreciated by consumers due to its rich content in water and carbohydrates which make it juicy, hydrating and tasty. It has a fine texture, full of flavour and sweet. It could be consumed in various ways: as such, cut in slices, in fruit salad, as dessert, watermelon juice, as garnish like vegetables, prepared as a stir-fried and stewed meal, pickled watermelon, candied fruit, jellies and jams etc [2, 25].

Depending on the cultivar, watermelon chemical composition consists of 89-94 % water, 7-11 % sugar, 0.2 % fats, 0.5 % protein, vitamins (A, B, C, H, PP) and minerals (2,5 mg Potassium, 0.2 mg Iron, 7 mg Calcium, Zinc). Its energetical value is 26-29 calories/100 g [2, 21].

Due to its chemical composition, nutritive and caloric value, watermelon is considered to be a healthy food.

Watermelon has a high content of sugar, a reason to be appreciated as a high glycemic food [3,4].

Being rich in C and A vitamins, antioxidants carotenes, watermelon plays an important role in neutralizing free radicals in the body.

Watermelon is rich in lycopene like tomatoes, carrots, apricots, papayas, pink grapefruit and guavas. The lycopene is the natural pigment which gives the red colour and it is a strong antioxidant successfully used in the fight against breast, prostate, lung, colorectal and endometrial cancer [8].

For this reason, watermelon, fruit and vegetable consumption in general, are recommended for cancer prevention.

Watermelon is rich in C vitamin with an important role in preventing viral infections and protecting A vitamin from oxidation. It is rich in Beta-carotene which is converted into the body into A vitamin, with an essential role in skin metabolism and prevention of skin diseases and macular degeneration, in reducing the risk of sight loss [8].

The vitamins from B complex play an important role in producing energy in the body and preventing nervous diseases.

The rich water content contributes to blood pressure regulation, kidneys cleaning of salts and weight loss, helping the diet grace to its diuretic effect.

Watermelon is also rich in citrulline, an amino-acid used by the body to create arginine, which is able to decrease blood pressure, eliminate ammonium from our body and stimulate the erectile function [20].

Watermelon is rich in Iron important for creating haemoglobin which transports oxygen from lungs to all the cells of the body and prevent anaemia [18].

Watermelon is rich in Potassium which stimulates heart muscle, regulates blood pressure and increases stress resistance.

Watermelon does not contain fats, only in negligible quantities and has not cholesterol. For this reason is recommended for a healthy diet, for body detoxification, metabolism and blood pressure regulation.

Its benefits on health make it to be recommended in the diet of the ill people of asthma, diabetes, cancer and arthritis [19, 24].

Melon has unknown origins, even thou many researchers considered to come either from Asia, more precisely India and Iran or in

Central and Tropical Africa where was cultivated earlier than 2,000 year B.C. [2]. In Europe it was spread in the 15th century, firstly in Italy, France and Belgium, and then it was brought to America in the 16th century. Melon has small fruits, but tastier compared to watermelon. They are sweet and tasty and are consumed especially in summer season as fruit salad, candied melon, jam, marmalade, juice and ice-cream.

Its chemical composition contains 8-12 % dry matter and 88-92 % water, 4.37-13.8 % sugar depending on variety, 0.5 % protein, 50-60 mg C vitamin/100 g, B1, B2, B6 vitamins, minerals (Calcium, Potassium, Phosphorus, Iron) and carotene 2-3 mg [2].

Melon fruit has a spherical shape in general and the shell colour could be green, olive, yellow or orange. The flesh is dense, floury or juicy, with a special flavour, fineness and sweetness characteristic to each cultivar. The pulp could be coloured in white-green, yellow or orange [2, 5].

Watermelon and melon production have continuously increased at world level, production performance depending of the cultivated varieties, soil and climate conditions, technologies applied from a country to another. Romania has good conditions for watermelon and melon growing mainly in the South, Eastern and Western part where high temperatures are favourable for fruit development [9, 22].

Among the Central and Eastern European countries, Romania is considered the largest producer and exporter of watermelons and melons.

In this context, the paper aimed to analyze Romania's watermelon and melon market in the last 20 years, considering as reference period 1990-2009, using the statistical data supplied by National Institute for Statistics [17] in order to identify the main trends in cultivated surface, average and total production, price, consumption and trade in the context of the development of the international and European market.

MATERIAL AND METHOD

In order to set up this paper, the following system of specific indicators has been used: cultivated surface and its distribution in the territory, yield and production and their distribution in various regions, price, consumption, and trade .

In this purpose, the data have been collected for the period 1990-2009 from the National Institute of Statistics and also from United Nations, FAO Stat, as well as from various reports analyzing vegetable and fruit sectors in Romania and at international level.

RESULTS AND DISCUSSIONS

World Production.

Watermelon is cultivated in the tropical and semitropical areas, being a plant loving warm seasons because it is resistant to drought. The main cultivators at world level are China, Turkey, Iran, Brazil, the USA, Egypt and Mexico [12, 16].

Melons are also cultivated in the hot regions of the world, and the main producing countries are China, Japan, Iran, Mexico at world level and in Europe: Spain, Italy, France, Greece and Portugal [1].

In the period 1970-2009, the world production of watermelons increased 4 times from 18 million tons in 1970 to 88 million tons in 2008 and 97 million tons in 2009, while the world population grew 2 times from 2.5 billion to 6.9 billion people, meaning that in 2009, the average watermelon production per capita was 35.2 kg [26].

In 2005, the world watermelon production was 90.2 million tons of which 71.5 % was produced by China (69.3 million tons), 3.9 % by Turkey (3.8 million tons), 2.2 % by Iran (2.2 million tons), 1.9 % by Brazil (1.9 million tons) and 1.8 % by the USA (1.7 million tons) [27].

In 2009, the world watermelon production reached 100,6 million tons and the main producers, in the decreasing order, were: China, Turkey, Iran, Brazil, the USA, Egypt, Russian Federation, Uzbekistan, Algeria, Mexico, Rep. of Korea, Spain, Syria, Morocco, Mali, Greece,

Thailand, Kazakhstan, Vietnam and Indonesia [16].

Table 1. World Watermelon Producers, 2010

Country	Watermelon Production Million Metric Tons	Watermelon Production Value USD Million
China	65,002	7,034
Turkey	3,810	303,4
Iran	3,075	350,2
Brazil	2,065	235,2
USA	1,765	188,4
Egypt	1,653	188,3
Russian Federation	1,419	116,0
Uzbekistan	1,071	51,7
Algeria	1,034	117,9
Mexico	1,007	114,7
Rep of Korea	846,9	96,4
Spain	819,1	88,5
Syria	749,4	81,1
Morocco	746,6	631,3
Mali	631,3	71,9
Greece	623,0	68,1
Thailand	580,1	66,1
Kazakhstan	579,1	57,5
Vietnam	526,1	59,9
Indonesia	474,1	54,0

Source: FAOStat, 2012

International trade with Watermelons has been continuously developing. In the period 1970-2009, it increased 10 times from 212,000 tons in 1970 to 2.3 million tones in 2009.

In 2005, the share of the major exporting countries in the world watermelon exported quantity was the following one: Mexico 18.5 %, Spain 15.6 %, the USA 8.8 %, Iran 7.3 %, Vietnam 6.1 % and Greece 5.2 %.

In 2005, the share of the major importing countries in the world imported amount of watermelons was: the USA 15.1 %, China 10 %, Germany 9.6 %, Canada 9.3 %, Poland 5.2 % and France 4.9 %.

In 2005, the total amount of exported watermelons counted for 2,175 thousand tons and the amount of imported watermelons counted for 1,987 thousand tons [27].

The top 20 largest exporters of watermelons in 2009, in the decreasing order, were the following ones: Mexico, Spain, the USA, Kazakhstan, Vietnam, Italy, Greece, the Netherlands, Guatemala, Iran, Panama,

Hungary, China, Turkey, Malaysia, Brazil, Costa Rica, Jordan, Egypt and Germany.

Table 2. The Top 20 Watermelon Exporters in the world in 2009

Country	Watermelon Exported Quantity (Thou tons)	Watermelon Export Value (USD 1000)	Watermelon Export Price (USD/Ton)
Mexico	554,4	287,681	519
Spain	377,2	215,983	572
USA	188,2	97,259	517
Kazakhstan	141,4	34,460	244
Vietnam	135,5	23,014	170
Italy	118,8	45,960	387
Greece	113,2	50,140	443
Netherlands	86,0	65,252	758
Guatemala	85,0	19,345	228
Iran	84,0	10,748	128
Panama	78,0	44,968	576
Hungary	66,2	19,742	298
China	57,8	15,140	262
Turkey	56,3	6,592	117
Malaysia	53,6	13,085	244
Brazil	39,0	15,735	403
Costa Rica	30,2	10,519	348
Jordan	18,4	13,293	722
Egypt	16,1	11,174	691
Germany	10,3	7,890	763

Source: FAOStat, 2012

Taking into account the export value, the order of the largest exporting countries in 2009 was the following one: Mexico, Spain, the USA, the Netherlands, Greece, Italy, Panama, Kazakhstan, Vietnam, Hungary, Guatemala, Brazil, China, Jordan, Malaysia, Egypt, Iran, Costa Rica, Germany and Turkey.

The watermelon export FOB price varied in 2009 between USD 117/Ton in Turkey, the lowest price level and USD 764/Ton in case of Germany, the highest level.

The average world price for watermelons was about USD 420/Ton.

The top 20 importing countries in the world in 2009, based on the amount of imported watermelons, in the decreasing order, were: the USA, China, Germany, Canada, France, Poland, United Arab Emirates, the Netherlands, Czech Republic, Russian Federation, United Kingdom, Italy, China Hong Kong, Austria, Slovakia, Spain, Sweden, Denmark, Switzerland and Norway.

Taking into account the import value, the decreasing order of the main importers of watermelons in the world in 2009 was the

following one: the USA, Germany, Canada, the Netherlands, France, United Kingdom, China, Poland, Russian Federation, Czech Republic, Austria, Italy, Norway, Spain, China Hong Kong, United Arab Emirates, Sweden, Denmark, Slovakia and Switzerland.

Table 3. The Top 20 Watermelon Importers in the world in 2009

Country	Watermelon Imported Quantity (Thou tons)	Watermelon Import Value (USD 1000)	Watermelon Import Price (USD/Ton)
USA	454,7	242,202	533
China	269,4	33,3	124
Germany	203,4	117,820	579
Canada	192,5	86,385	449
France	111,1	59,070	531
Poland	100,1	32,877	328
United Arab Emirates	82,5	12,591	153
Netherlands	82,0	61,947	755
Czech Republic	81,6	28,368	348
Russian Federation	76,5	29,592	387
United Kingdom	50,8	36,397	716
Italy	36,7	19,750	537
China Hong Kong	28,2	12,875	456
Austria	27,7	21,517	775
Slovakia	25,3	11,472	453
Spain	21,0	13,773	655
Sweden	20,8	12,399	596
Denmark	18,8	11,902	633
Switzerland	16,1	11,245	695
Norway	15,5	14,574	934

Source: FAOStat, 2012

The import CIF price of watermelons varied between USD 124/Ton in case of China, the lowest level and USD 775/Ton in case of Austria.

The average world import price for watermelons was USD 532/Ton.

The EU Watermelon and Melon Market.

The main EU watermelon producers are: Spain, Greece, Italy but also the CEE countries such as Romania and Hungary.

Among the most important watermelon varieties cultivated for exportation to Europe are the MikeyLee, Crimson and Quetzal.

The main EU exporters are Spain, Italy and Germany and the main EU importers are Germany, France, Poland, Netherlands, Czech

Republic, Italy, Austria, Slovakia, Spain, Sweden and Denmark.

Spain is the greatest producer and exporter of watermelons in Europe.

Watermelons comes on the 5th position among the imported tropical fruits in the EU after pineapple, melon, avocados, guavas and mangoes, representing 3 % of imported tropical fruits.

The share of the main suppliers in the Europe's watermelon imports is the following one: Honduras 31.5 %, Costa Rica 22.8 %, Guatemala 22.5 %, Brazil 6.8 %, Cyprus 3.3 %, Egypt 2 %, Iran 1.5 %, Israel 1 % and other countries 9.6 %.

The main EU watermelons importers are Germany (36 %), Italy (20 %), France (19 %), the Netherlands (8.3 %), United Kingdom (4.7 %), Greece (0.5%), Spain (0.27%), Scandinavian countries (6.39 %) and other countries (7.51 %) [13].

The main EU watermelon exporters are Spain (62 %), Greece (20 %), Italy (11 %), the Netherlands (3.56 %), France 91.92 %), Germany (0.78 %), United Kingdom (0.19 %) [13].

Melon is another important tropical fruit marketed in the EU. It comes on the 2nd position after pineapple.

The main varieties of melon marketed in the EU are Charentais, Honeydew, Galia, Skin of Toad and Canary Yellow.

Melon represents about 22 % of the tropical fruits imported by the EU.

The main melon suppliers for the EU are Brazil (42 %), Costa Rica (22 %), Israel (13.5 %), Morocco (11 %), Honduras (93.6 %), Ecuador (1.4 %), Guatemala (1.2 %) and other countries (6.3 %).

The most important EU melon importers are United Kingdom (28 %), the Netherlands (18 %), France (17.7 %), Germany (17.2 %), Spain (2.4 %), Italy (3.9 %), Greece (0.13 %) and other countries (7.5 %).

The main EU melon exporters are Spain (77%), the Netherlands (10.3 %), France (7.7 %), Italy (2.46 %), Germany 91,31 %) and Greece (0.38 %)[13].

Watermelon and melon consumption in the EU is relatively flat, the highest level being recorded in the Southern Europe followed by

the Eastern European countries. The lowest consumption was noticed in the Northern and Western European countries.

In the regional market from the CEE countries, Romania is considered to be the largest producer followed by Hungary, Ukraine and Albania.

The distribution channels are represented by local and regional traders, fruit wholesalers and multiple retailers. Also, in the watermelon and melon chain, an important place is played by importers assuring additional amounts for a better covering of the market demand and exporters responsible to bring more currency in order to balance the trade and payment balance [28].

The main watermelon and melon consumers in Europe are Spain, Greece, Italy, Germany, France and United Kingdom.

Romania's watermelon and melon market.

Watermelon and melon cultivars.

In Romania, there are many cultivars created or imported but adapted to the local soil and climate conditions. They are different regarding the period of vegetation and maturation moment being classified in extra-early, early, semi-early, semi-tardy and tardy cultivars and varieties. Also, they are different concerning the vigour, stress resistance, the extra-early and early cultivars being more sensitive to stress, diseases and pest attack in comparison with the tardy cultivars. The fruit are also different in shape and weight.

The main watermelon cultivars and hybrids cultivated in Romania, classified according to the moment of maturation are: a)Extra-early cultivars: Crisby F1, Granit F1; b)Early cultivars: Sugar Baby, Timpuriu de Canada, Red Star, Lasy F1, Top Gun F1, Farao F1; c) Sei-early cultivars: Crimson Sweet, Oden, Fabiola F1, Dochita; d)Tardy cultivars: De Dabuleni, Dulce de Dabuleni, De Minis Paradise F1; e)Tardy cultivars: Clausita, Favorit, Charleston Gray.

The main favourable areas for watermelon production in Romania are the South East part of the country, the South West Oltenia and the South Muntenia [14,15]. Watermelon is mainly cultivated on sandy soils in Galatzi, Dolj, Braila, Olt, Mehedinti, Teleorman, Bihor and

Satu Mare counties where the soil and climate conditions are suitable for this crop [7].

The watermelon and melon cultivated surface is 33,500 ha and the average production is about 20 t/ha, but it could be higher reaching 25-40 t/ha depending on the cultivar and variety cultivated in the field and seed production is about 150-200 kg/ha [10].

Melons are cultivated on about 2.500 - 3,000 ha in the field and an increased trend is to be more cultivated as a forced crop in protected areas.

Melon cultivars could be cultivated either in the field, green houses or tunnels.

The cultivars suitable to be cultivated in the field are classified into: a) *Early cultivars* such as: Ica, Roger, Templar F1, Turkestan, Fondant, b) *Semi-Early cultivars* such as: Cantalup, Creso F1, Ogen, Titus and c) *Semi-Tardy cultivars* such as: Comoara Ungariei, Delicios.

The cultivars suitable to be cultivated in greenhouses are classified according to the flesh colour as follows: a) *Yellow flesh cultivars* such as : Cristal, Cantor, Savor, Odybis, Vedor, Doublon, Galia and b) *Green flesh cultivars* such as Overgen, Halon and Noy Israel.

Melon average production varies between 20 and 30 t/ha when melons are cultivated in the field, 60-80 t/ha when melons are cultivated in greenhouses and 35-40 t/ha when they are cultivated in the tunnels [2].

Watermelon and melon cultivated area has registered a continuous increase from 33.6 thousand ha in 1990 to the maximum 46.2 thousand ha in the year 2000 but after this year it decreased reaching 33.5 thousand ha in 2009, that is approximately the same level like in 1990,

The share of the cultivated surface area with watermelons and melons in the total cultivated area in the country has increased from 0.36 % in 1990 to 0.42 % in 2009, in the last analyzed year being by 16 % higher than in the first one.

Taking into account that the cultivated surface with vegetables increased from 250.6 thousand ha in 1990 to 267.1 thousand ha in 2009, the share of watermelon and melon cultivated area in the vegetable cultivated area registered a decline from 13.4 % in 1990 to 12.54 % in 2009

Table 4. Watermelon and melon cultivated area in Romania, 1990-2009 (Thousand ha)

	1990	1995	2000	2005	2009	2009/ 1990 %
Cultivated area Total	9,402	9,225	8,450	8,468	7,884	83.85
Watermelon and melon cultivated area	33.6	45.7	46.2	37.2	33.5	99.70
Share of watermelon and melon in total cultivated area (%)	0.36	0.50	0.55	0.44	0.42	116.66
Vegetable cultivated area	250.6	260.4	281.9	266.7	267.1	106.58
Share of watermelon and melon in vegetable cultivated area (%)	13.40	17.54	16.38	13.94	12.54	93.58

Source: National Institute of Statistics, 2012, Own calculations

The cultivated area in the private sector increased by 91.95 % in the analyzed period from 17.4 thousand ha in 1990 to 33.4 thousand tons in 2009. As a result, the share of private sector in the cultivated area with watermelons and melons to grow from 51.7 % in 1990 to 99.7 % in 2009.

Table 5. Watermelon and melon cultivated area in the private ownership, Romania, 1990-2009 (Thousand ha)

	1990	1995	2000	2005	2009	2009/ 1990 %
Watermelon and melon cultivated area in the private sector	17.4	44.7	45.2	36.6	33.4	191.95
Share of private sector (%)	51.70	97.81	97.83	98.38	99.70	192.84

Source: National Institute of Statistics, 2012, Own calculations

Based on the surface cultivated with vegetables and watermelons and melons, Romania comes on the 5th position in the European market with a share of 6.2 % in the total cultivated surface in Europe after the Russian Federation, Ukraine, Italy and Spain.

The distribution of watermelon and melon cultivated area in the territory in the year 2009 showed that the most significant surface is cultivated in the macro-region M1, 16,639 ha,

with a share of 49.68 %. On the 2nd position came the macro-region M4 with 9,536 ha and a share of 28.47 % in the cultivated area with watermelons and melons. On the 3rd position came the macro-region M3 with 6,099 ha, representing 18.21 % and on the 4th position was macro-region M1 with 1,222 ha (3.64 %). In 2009, the situation by micro-zone was the following one: 40.99 % South-East micro-zone, 23.49 % South West Oltenia, 17.81 % South Muntenia, 8.69 % North East and 4.98 % West.

Table 6. Watermelon and Melon Cultivated Area by Macro and Micro-regions, Romania, 2009

Region	Cultivated area-ha	Share -%
Cultivated area at national level	33,496	100.00
M1	1,222	3.64
-NW	1,060	3.16
-Centre	162	0.48
M2	16,639	49.68
-N-E	2,911	8.69
-S-E	13,728	40.99
M3	6,099	18.21
-S.Muntenia	5,968	17.81
-Bucharest-Ilfov	131	0.40
M4	9,536	28.47
-SW Oltenia	7,870	23.49
-W	1,666	4.98

Source:National Institute for Statistics, 2012, Own calculations.

The hierarchy of the counties based on the cultivated surface with watermelons and melons was the following one: Galatzi 5,760 ha, Dolj 5,133 ha, Ialomitza 3,581 ha, Braila 3,544 ha, Buzau 2,634 ha, Olt 1,552 ha, Mehedintzi 1,170 ha, Teleorman 1m149 ha, Iasi 1,088 ha, Vaslui 1,068 ha, Arad 1,037 ha and Bihor 988 ha. All these 12 counties together totalize 28,704 ha, representing 85.69 % of the whole watermelon and melon cultivated area in Romania.

Watermelon and melon yield has continuously increased from 11,242 kg/ha in 1990 to 19,490 kg/ha in 2009, meaning 73.36 % growth. This was a consequence of the fact that more and more farmers have been focused on the implementation of modern technologies and the use of high productive cultivars.

In the private sector, the average production increased by 2.11 times from 9,213 kg/ha in 1990 to 19,499 kg/ha in 2009.

Table 7. Watermelon and Melon Yield, Romania, 1990-2009 (kg/ha)

Specification	1990	1995	2000	2005	2009	2009/1990 %
National average	11,242	13,628	11,500	18,602	19,490	173.36
Private sector	9,213	13,778	11,570	18,748	19,499	211.64
Share of private sector in national average	81.95	101.10	100.60	100.78	100.05	122.08

Source:National Institute for Statistics, 2010, Own calculations.

The distribution of watermelon and melon yield in the territory showed that M4 achieved 20,466 kg/ha by 5 % more than the national average; M1 carried out 19,894 kg/ha by 2.07 % more than at national level and M2 obtained 19,894 kg/ha by 2.07 % more. Only M3 has a lower production potential because the yield counted for 16,760 kg/ha by 15 % less than the national average.

Table 8. Watermelon and Melon Yield by Macro and Micro-regions, Romania, 2009

Region	Yield kg/ ha	Share (%)
National Yield	19,940	100.00
M1	20,002	102.62
-NW	20,002	102.62
-Centre	20,000	102.61
M2	19,894	102.07
-N-E	16,345	83.86
-S-E	20,647	105.93
M3	16,760	85.99
-S.Muntenia	16,701	85.69
-Bucharest-Ilfov	19,420	99.64
M4	20,466	105.00
-SW Oltenia	20,324	104.27
-W	21,136	108.44

Source:National Institute for Statistics, 2012, Own calculations.

In 2009, the highest watermelon and melon yield was achieved by the following counties: Dambovitza 28,118 kg/ha, Galatzi 26,888 kg/ha, Arad 24,134 kg/ha, Satu Mare 23,239 kg/ha, Alba 22,500 kg/ha, Dolj 21,696 kg/ha, Bacau 21,340 kg/ha, Teleorman 21,336 kg/ha and Vrancea 20,406 kg/ha.

Watermelon and Melon Production. Based on watermelon and melon production, Romania comes on the 8th position in Europe contributing by 4.2 % to the European production after the Russian Federation, Spain, Ukraine, Poland, France and the Netherlands [6].

Watermelon and melon production increased by 71.06 % from 81.6 thousand tons in 1990 to 652.8 thousand tons in 2009. In the private sector, production grew by 2.34 times from 277.5 thousand tons in 1990 to 652.1 thousand tons in 2009.

Compared to the growth rate of vegetable production, 27.88 %, in the analyzed period, we may notice that the increased rate of 71.06 % for watermelon and melon production is dramatically higher. As a result, the share of watermelon and melon production in vegetable production has increased from 12.50 % in 1990 to 16.73 % in 2009, that is by 33.84 %.

Table 9. Watermelon and Melon Production, Romania, 1990-2009 (thousand tonnes)

Specification	1990	1995	2000	2005	2009	2009/1990 %
Watermelon and melon production	381.6	639.4	531.1	691.8	652.8	171.06
Private sector	277.5	632.2	522.8	685.3	652.1	234.99
Share of private sector in watermelon and melon production (%)	72.72	98.87	98.43	99.06	99.89	137.36
Vegetable Production	3,051	3,869	3,381	3,625	3,902	127.88
Share in vegetable production (%)	12.50	16.52	15.7	19.88	16.73	133.84

Source:National Institute for Statistics, 2012, Own calculations.

The distribution of watermelon production in the territory showed that in 2009 the decreasing order of the macro-regions was the following one: M2-331,033 tons (50.71 %), M4- 195,163 tons (29.90 %), M3- 102,217 tons 915.65 %) and M1 -24,442 tons (3.74 %).

The most important producing counties are the following ones: Galatzi 154,872 tons, Dolj 111,367 tons, Braila 55,640 tons, Ialomitza 55,024 tons, Buzau 47,551 tons, Olt 34,555 tons, Arad 25,027 tons, Teleorman 24,515 tons which together totalize 508,551 tons, contributing by 77.89 % to the total production of watermelon and melons in the country.

Production per inhabitant has increased year by year from 16.44 kg/capita in 1990 to 30.40 kg/capita in 2009 as a result of production increase by 71.06 % but also due to the

reduction of Romania' s population by 7.50 % in the same period of time.

Table 9. Watermelon and Melon Production by Macro and Micro-regions, Romania, 2009

Region	Production Tons	Share (%)
National Production	652,844	100.00
M1	24,442	3.74
-NW	21,202	3.24
-Centre	3,240	0.50
M2	331,022	50.71
-N-E	47,579	6.98
-S-E	283,443	43.73
M3	102,217	15.65
-S.Muntenia	99,673	15.26
-Bucharest-Ilfov	2,544	0.39
M4	195,163	29.90
-SW Oltenia	159,951	24.50
-W	35,212	5.40

Source:National Institute for Statistics, 2012, Own calculations.

Table 10. Watermelon and Melon Production per Inhabitant

Specification	1990	1995	2000	2005	2009	2009/1990 %
Romania's population (thou people)	23,206	22,681	22,435	21,624	21,470	92.50
Watermelon and melon production (thou tons)	381.6	639.4	531.1	691.8	652.8	171.06
Production per inhabitant (kg/capita)	16.44	28.19	23.67	31.99	30.40	184.91

Source:National Institute for Statistics, 2012, Own calculations.

Watermelon and Melon Consumption.

As well as vegetable production registered an increased trend, vegetable consumption has also increased. For instance in 2011, it was by 11 % higher than in 2010. This was determined by the increased demand of vegetables in the Romanian market.

However, the annual vegetable and fruit consumption in Romania is 70-80 kg/capita in average, by about 20-22 % less than the European average, 90-100 kg/capita.

In the year 2011, the Romanians' average consumption of vegetable and fruit and products made of vegetables and fruits counted for 174.4 kg, meaning 63.3 kg/capita for fresh fruits in fresh fruit equivalent [23].

Watermelon and Melon Average Sale Price has increased year by year. In 2004, it was by 2.3 times higher than in the year 2000. In the period 2006-2008, watermelon and melon price increased just a little, but in 2008, the price grew by 47.70 % compared with its level in 2005.

Table 11. Watermelon and Melon Price indices for 2004-2009 (2000=100, 2005=100)

	2004	2005	2006	2007	2008	2009
Total Price Index	230.8	215.8	106.0	128.6	147.7	185.1
Watermelon and melon price indices	94.7	109.9	111.6	100.3	110.2	120.1

Source: National Institute for Statistics, 2012.

Watermelon and Melon Trade is an important source of income for Romania.

Watermelon export increased from 0.8 t and a value of Euro 1,700 in the year 2008 to 2.5 tons with a value of Euro 3,900 in 2009.

The watermelon and melon imports have been higher than the exports, meaning a poor balance and that Romania is a net importer. In 2008, Romania imported 328.2 tons whose value was Euro 386,700. In 2009, the imports decreased to 286 tons with a value of Euro 308,200 [6].

Imports are important to complete domestic production and cover better the consumer's needs but also they another positive effect on the Romanian producers because local watermelons and melons are more preferred by consumers.

CONCLUSIONS

The world watermelon production is continuously increasing because of the higher market demand. In 2009, it reached 100,6 million tons.

The top producing countries in the world are China, Turkey, Iran, Brazil, the USA, Egypt, Russian Federation, Uzbekistan, Algeria, Mexico, Rep. of Korea and Spain.

In 2009, the top 10 largest exporters of watermelons were Mexico, Spain, the USA, Kazakhstan, Vietnam, Italy, Greece, the Netherlands, Guatemala and Iran.

Based on the imported watermelons and melons in 2009, the top 10 importing countries in the world were the USA, China, Germany, Canada,

France, Poland, United Arab Emirates, the Netherlands, Czech Republic and Russian Federation.

Watermelons comes on the 5th position among the imported tropical fruits in the EU after pineapple, melon, avocados, guavas and mangoes, representing 3 % of imported tropical fruits.

Spain is the greatest producer and exporter of watermelons in Europe. Also other important producers are Russian Federation, Ukraine, Poland, France, the Netherlands and Italy.

The main trends in Romania watermelon and melon market are: a) the constant cultivated area at 33.5 thousand ha; b) the main cultivating regions are the East, West and Southern Romania; c) Romania registered a continuous increase of watermelon and melon yield and production; d) the offer in the market is a diversified one consisting of both domestic watermelons and melons and also imported ones mainly from Turkey, Greece and Spain; e) the use of a large range of cultivars and varieties has enlarged the period of consumption starting by 1,5 months earlier than before, more precisely from the beginning of June, instead of the 2nd part of July and beginning of August; f) as a result consumer needs are better covered along the Summer season; g) an increased income and profit is assured to farmers who are able to cultivate extra-early and early cultivars and varieties because watermelons are sold at the best price in June when offer is still smaller than demand. Romania comes on the 8th position in Europe concerning watermelon and melon production. But in the regional market from the Centre and Eastern Europe, Romania is the main producer and exporter being followed by Hungary, Ukraine and Albania.

The main problems Romania has to solve in order to improve watermelon production and marketing is: the delivery of irrigation water at an accessible price, the building of big conditioned warehouses in order to preserve watermelons and melons for a longer period of time, the organization of a wholesale market where price to be established based on offer/demand ratio, the constant contracts concluded with the hypermarkets and supermarkets in order to assure a continuous

supply to consumers and income flow for Romanian producers.

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